XIV. PROCESS ANALYSIS AND SYNTHESIS

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RESEARCH OBJECTIVES

The objective of this research is the study of synthesis of linear systems that fundamentally must perform a given functional operation on a large class of functions. Our study proceeds by (a) prescribing a linear operator P that describes the linear operation in mind; and (b) assuming a large class of functions over which P must operate. For example, this class can be the real, single-valued functions of banded variations that are piecewise continuous and may possess a denumerable set of points of simple discontinuity. The synthesis is attained when we find a physically realized linear system representing the operator P.

Additional requirements are imposed in order to guarantee the usefulness of the synthesis design. These are:

(a) The resulting linear system must be finite.
(b) The character of the system elements and synthesis procedure must be simple.
(c) In case of approximate solutions, the method of synthesis must provide means of increasing the accuracy of solution, as much as we please.
(d) The resolution time of the system must be finite – in fact, it must be very small.

Applications to pattern recognition, signal separation, and pictorial representation are under investigation.

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